BRUHAT BANGALORE MAHANAGARA PALIKE

BYTARAYANPURA DIVISION

Name of Work: Package no.01 (Package Consists of 18 Works)

3rd & PART BILL

TEST REPORTS

TEJUS CONSULTANTS
CONSULTING ENGINEERS AND DESIGNERS
No.58 MIG, 6th Cross, 3rd Main
1st Stage, Basaveshwaranagar
Bangalore-560079
☎ 080 - 23287532
email: tejusconsultants@gmail.com

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BRUHAT BANGALORE MAHANAGARA PALIKE
BYTARAYANPURA DIVISION

Name of Work: Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06 (Thanisandra), Byatarayanapura Sub Division.

3rd & PART BILL

TEST REPORTS

TEJUS CONSULTANTS
CONSULTING ENGINEERS AND DESIGNERS
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email: tejusconsultants@gmail.com

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TEJUS
CONSULTANTS

No. TC / BBMP / RI / BYT-PMC / 410 / 19 – 20

Date:

To
The Executive Engineer
Byatarayanapura Division,
Bruhat Bangalore Mahanagara Palike,
angalore.

ear Sir

Sub: Package No.01 (Package consists of 18 works).

reference to the above subject, this is to bring to your kind notice that we have scrutinized the **Third RA bill** ubmitted by Sri D Narahari, Bangalore, towards the above said work and arrived at an amount of **Rs. ,10,98,266.19/-(Rupees One Crore Ten Lakh Ninty Eight Thousand Two Hundred Sixty Six and Paise Vinteen Only)**. The work has been completed satisfactorily.

This is for your kind information.

Thank you and assuring you the best of our Services at all the times

For Tejus Consultants
Nischal M

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Test Report on Cement

TEJUS

Project	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers & Project Pvt.Ltd.
Sample ID	Cement
Date of Sample Tested	25.11.2019
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	37 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	378 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	6mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	28.00%	25 % to 35

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TEJUS
CONSULTANTS

TEST REPORT	
Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thamisandra). Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt Ltd

SPECIFIC GRAVITY AND WATER ABSORPTION

FINE AGGREGATE (IS-2386-PART-3)

Type of Material	Fine aggregate (River Sand/ M sand)	Proposed Use	concrete
Location/Source	At Site/Plant	Date of Sampling	25.11.2019
Period of Soaking	24 hours	Date of Testing	25.11.2019

Sl. No.	Test Property	TRIAL - 1	TRIAL - 2	TRIAL - 3	
A	Weight of sturated surface dry sample gm	652	680	658	
B	Weight of oven - dry sample gm	643	670	648	
C	Weight of Pycnometer Filled with water gm	1275	1275	1275	
D	Weight of Pycnometer + sample + water gm	1686	1704	1690	
E	Bulk specific gravity $\frac{B}{(C+A-D)}$	2.668	2.669	2.667	2.668
G	Absorption (%) $\frac{(A-B)*100}{B}$	1.400	1.493	1.543	1.478

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TEST REPORT

nts	Bruhat Bangalore Mahanagara Palike
ject	Improvement of Drains and Asphalting of Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
sultants	Tejus Consultants, Bangalore
ntractor	Benaka Developers & Project Pvt.Ltd.

SIEVE ANALYSIS

al Weight:	3000 gms		
pe of terial	Fine aggregate (River Sand/ M sand)	Proposed Use	Concrete
mple cation	At Site/Plant	Date of Sampling	25.11.2019
		Date of Testing	25.11.2019

S Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
00 mm	0	0	0	100.00	100
5 mm	206	206	6.87	93.13	90 - 100
6 mm	308	514	17.13	82.87	75 - 100
8 mm	412	926	30.87	69.13	55 - 90
00 mm	480	1406	46.87	53.13	35 -59
00 mm	762	2168	72.27	27.73	8-30
50 mm	640	2808	93.60	6.40	0 - 10
n	192	3000			-

marks : ✓ Satisfactory / Not Satisfactory

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TEST REPORT

TEJUS CONSULTANTS

lients	Bruhat Bangalore Mahanagara Palike	
roject	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division	
onsultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore	
ontractor	Benaka Developers & Project Pvt.Ltd.	
otal Weight:	10000	gms

SIEVE ANALYSIS

ype of Material	20 mm down size	**Proposed Use**	Concrete
ample Location	Plant/At site	**Date of Sampling**	25.11.2019
		Date of Testing	25.11.2019

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
40.00 mm	0	0	0	100	100
20.00 mm	270	270	2.70	97.30	95 - 100
10.00 mm	4840	5110	51.10	48.90	25 - 55
4.75 mm	4218	9328	93.28	6.72	0 - 10
Pan	672	10000			

emarks : Satisfactory / Not Satisfactory

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TEST REPORT

TEJUS CONSULTANTS

Clients	Bruhat Bangalore Mahanagara Palike	
Project	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division	
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore	
Contractor	Benaka Developers & Project Pvt.Ltd.	
Total Weight:	10000	gms

SIEVE ANALYSIS

Type of Material	20 mm down size	Proposed Use	Concrete
Sample Location	Plant/At site	Date of Sampling	25.11.2019
		Date of Testing	25.11.2019

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
40.00 mm	0	0	0	100	100
20.00 mm	270	270	2.70	97.30	95 - 100
10.00 mm	4840	5110	51.10	48.90	25 - 55
4.75 mm	4218	9328	93.28	6.72	0 - 10
Pan	672	10000			

Remarks : Satisfactory / Not Satisfactory

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike	
Project	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division	
Consultants	TEJUS CONSULTANTS	
Contractor	Benaka Developers & Project Pvt.Ltd.	
Total Weight:	10000	gms

SIEVE ANALYSIS

Type of Material	12.5 mm down size	**Proposed Use**	CONCRETE
Sample Location	At Site/Plant	**Date of Sampling**	25.11.2019
		Date of Testing	25.11.2019

IS Sieve Size (in mm)	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
20.0	0	0	0	100	100
12.5	550	550	5.50	94.50	90-100
10.0	4645	5195	51.95	48.05	40-85
4.75	4538	9733	97.33	2.67	0-10
Pan	267	10000			

Remarks : ✓ Satisfactory / Not Satisfactory

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TEJUS

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Project	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers & Project Pvt.Ltd.
Grade of concrete:	M20
Size of cube:	150x150x150 mm
Reference IS code:	IS:516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	25.11.2019	02.12.2019	7 days	8.120	22500	290	12.89	12.89
2	25.11.2019	02.12.2019	7 days	8.130	22500	288	12.80	
3	25.11.2019	02.12.2019	7 days	8.140	22500	292	12.98	

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Authorised Signatory

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TEJUS

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Project	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers & Project Pvt.Ltd.
Grade of concrete:	M20
Size of cube:	150x150x150 mm
Reference IS code:	IS 516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	25.11.2019	23.12.2019	28 days	8.130	22500	436	19.38	19.53
2	25.11.2019	23.12.2019	28 days	8.138	22500	442	19.64	
3	25.11.2019	23.12.2019	28 days	8.146	22500	440	19.56	

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS

oject	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
ient	BRUHAT BANGALORE MAHANAGARA PALIKE		
nsultant	M/s Tejus Consultants		
ntractor	Benaka Developers & Project Pvt.Ltd.		
oposed e	WMM	**Date of Sampling**	12.01.2020
mple cation	At plant	**Date of Testing**	12.01.2020

No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	354.00	342.00	352.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	272.00	262.00	268.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	82.00	80.00	84.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	23.16	23.39	23.86	
5	Average Aggregate impact value	(%)	23.47			Max - 30 %

marks : ✓ Satisfactory / Not Satisfactory

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ived in the laboratory/Site.
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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

TEJUS CONSULTANTS

Project	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thamsandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	Proposed Use	WMM
Sample Location	At plant	Date of Sampling	12.01.2020
		Date of Testing	12.01.2020

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	834	72	762	52
16.0	12.5	1206	112	1094	120
12.5	10.0	452	72	380	62
10.0	6.3	508	62	446	38
Total		3000	318	2682	272

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%)	10.60
Elongation Index(%)	10.14
Combined FI+EI (%)	20.74

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers & Project Pvt.Ltd
Date of Testing	:	12.01.2020
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	Date of Sampling:	12.01.2020
Type of material & Purpose:	WMM	Date of testing:	12.01.2020
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	418	418	4.18	95.82	95-100
22.4	2532	2950	29.50	70.50	60-80
11.2	1926	4876	48.76	51.24	40-60
4.75	1436	6312	63.12	36.88	25-40
2.36	1320	7632	76.32	23.68	15-30
0.6	874	8506	85.06	14.94	8.0-22.0
0.075	846	9352	93.52	6.48	0-8
Pan	648				
Total	10000				

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Project	Improvement of Drains and Asphalting of Roads at Bhuvaneshwarinagara Cross Roads in Ward No.06(Dharmasandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd		
Date of Testing	12.01.2020		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6156	6118	6208
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9736	9732	9715
Wt. of sand in cone (w3) gms.	835	842	830
Wt of sand in hole (w4)=(w1-w2-w3) gms.	3429	3426	3455
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.35	2.36	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
DD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.09	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.19	98.32	98.17
Compaction Required	98%	98%	98%

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

roject	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
lient	BRUHAT BANGALORE MAHANAGARA PALIKE
onsultant	M/s Tejus Consultants
ontractor	Benaka Developers & Project Pvt.Ltd.

roposed e	BC	**Date of Sampling**	02.02.2020
imple ocation	At plant	**Date of Testing**	02.02.2020

No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	378.00	364.00	346.00	
	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	284.00	276.00	262.00	
	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	94.00	88.00	84.00	
	Aggregate Impact Value (%)	(Wc/Wa)*100	24.87	24.18	24.28	
	Average Aggregate impact value	(%)	24.44			Max - 30 %

narks : ✓ Satisfactory / Not Satisfactory

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GRADATION FOR BC
(As per MORT&H 500-18,Grading-2)

Name of Work	:	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	02.02.2020
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	02.02.2020
Type of material & Purpose:	BC	Date of testing:	02.02.2020
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	132	132.0	11.00	89.00	79 - 100
9.50	112	244.0	20.33	79.67	71 - 95
4.75	226	470.0	39.17	60.83	53 - 71
2.360	128	598.0	49.83	50.17	42 - 58
1.180	140	738.0	61.50	38.50	34 - 48
0.600	110	848.0	70.67	29.33	26 - 38
0.300	116	964.0	80.33	19.67	18 - 28
0.150	66	1030.0	85.83	14.17	12 - 20
0.075	102	1132.0	94.33	5.67	4 - 10
Pan	68.0				
Total	1200.0				

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TEJUS CONSULTANTS
No. 586, 3rd main, 5th Cross, 1st Phase, Kasturi Nagar

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

TEJUS CONSULTANTS

Project :	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor:	Benaka Developers & Project Pvt.Ltd.

Type of Material	BC	Proposed Use	BC
Sample Location	At plant	Date of Sampling	02.02.2020
		Date of Testing	02.02.2020

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	632	73	559	70
16.0	12.5	1224	112	1112	85
12.5	10.0	524	72	452	60
10.0	6.3	520	56	464	50
Total		2900	313	2587	265

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.79
Elongation Index(%):	10.24
Combined FI+EL (%)	21.04

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvement of Drains and Asphalting of Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd
Date of Testing :	02.02.2020
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.768	0.738	0.753
Final weight of plate after application of Tack Coat (c)	Kg	0.791	0.781	0.778
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq m	0.250	0.256	0.251
Average	Kg/sq m	0.252		
Specified Lamit	Kg/sq m	**0.230 Kg/sq.m**		

Note:

1. The report shall not be reproduced, except in full, without the written approval of the laboratory.
2. The results indicated above are based on the tests carried out on the samples received in the laboratory/Site
3. Any Query regarding the report must be reported reported within 15days from the date of testing.

Authorised Signatory

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

ame of Work :	Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
lient :	BRUHAT BANGALORE MAHANAGARA PALIKE
onsultant :	M/s Tejus Consultants
ontractor :	Benaka Developers & Project Pvt.Ltd.
ate of Testing :	02.02.2020
;pe of Mix :	BC
imple I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
Weight of Mixture before extraction, g	866	792
Weight of Mixture after extraction, g	820	751
Weight of Bitumen	46	41
Weight of filter paper before extraction, g	2.00	2.00
Weight of filter paper after extraction, g	4.10	4.00
Weight of fines, g	1.40	1.70
Weight of Bitumen & fines	47.40	42.70
Bitumen content in %	5.47	5.39
Average Bitumen content in %	5.43	
Minimum Bitumen content in %	5.40	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

mple Location:	At site		Date of Sampling:	
pe of material & rpose:	BC		Date of testing:	
			Oven Dry Wt.(gms):	820.0

S Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	96	96.0	11.71	88.29	79 - 100
9.50	104	200.0	24.39	75.61	71 - 95
4.75	112	312.0	38.05	61.95	53 - 71
2.360	118	430.0	52.44	47.56	42 - 58
1.180	84	514.0	62.68	37.32	34 - 48
0.600	64	578.0	70.49	29.51	26 - 38
0.300	78	656.0	80.00	20.00	18 - 28
0.150	51	707.0	86.22	13.78	12 - 20
0.075	60	767.0	93.54	6.46	4 - 10
Pan	53.0				
Total	820.0				

ote:

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